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OF THE

MASSACHUSETTS ASSOCIATION

OF

BOARDS OF HEALTH

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Information for the Public

JULY, 1898

Proceedings of the April Annual Meeting

Subjects: Proper Isolation of Infectious Diseases — A Model Dairy Farm

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April Meeting, 1898

SUBJECTS: Proper Isolation of Infectious Diseases — A Model Dairy Farm

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THE JOURNAL OF THE MASSACHUSETTS ASSOCIATION OF BOARDS OF HEALTH.

THE MASSACHUSETTS ASSOCIATION OF BOARDS OF HEALTH was organized in Boston in March, 1890, with the following objects: the advancement of sanitary science in the Commonwealth of Massachusetts; the promotion of better organization and co-operation in the local Boards of Health; the uniform enforcement of sanitary laws and regulations; and the establishment of pleasant social relations among the members of the Association.

All persons holding appointments as members of a Board of Health in a Massachusetts city or town, the executive officers of such a local board, and the members of the State Board of Health are eligible to membership. Other persons may be elected members by vote of the Association. The annual dues are one dollar and fifty cents.

The Association holds four regular meetings each year, the annual or January meeting always being held in Boston.

THE OFFICIAL JOURNAL OF THE ASSOCIATION is a quarterly publication, containing the papers read at the meetings, together with verbatim reports of the discussions following them. No part of this matter is printed in any other periodical.

The JOURNAL will present, from quarter to quarter, a fair and adequate picture of the progress of practical sanitary science as applied to the needs of a modern community. The various subjects which are reviewed in the quarterly meetings of the Association are treated by experts qualified to speak from daily experience in Public Health offices, who, as men of science, are careful to be scientific and comprehensive, and who, as public officers, are no less careful to speak pertinently and so as to be easily intelligible to the layman.

The JOURNAL, in a word, appeals to all whose interests touch the questions of sanitation and hygiene,— to the architect, the school-committee-man, the manufacturer, the contractor, and, above all, to the busy practitioner who has no time for any reading but what is brief and to the point.

The subscription price of the JOURNAL is one dollar a year, payable in advance. Single numbers, twenty-five cents. It is on sale at the Old Corner Bookstore, and at Smith & McCance's Bookstore, 57 Bromfield Street, Boston.

All communications to the Association should be addressed to the Secretary, **EDWIN FARNHAM, M.D., City Hall, Cambridge, Mass.**

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VOL. VIII. July, 1898. NO. 2

APRIL MEETING

OF THE

Massachusetts Association of Boards of Health.

The quarterly meeting of the Massachusetts Association of Boards of Health was held at the Woodland Park Hotel, Auburndale, Mass., on the afternoon of Thursday, April 28, 1898, the Association being the guests of Mr. George H. Ellis. The Vice-President, Dr. S. H. Durgin, was in the chair. After the dinner the proceedings were as follows: —

THE CHAIRMAN. — I am sorry to interrupt you at this point, calling you from refreshment to labor; but our time is very short this afternoon, and we must hasten to our work. The Executive Committee recommends for membership in the Association the following candidates: —

DR. J. T. BULLARD	New Bedford.
DR. C. ASHLEY	New Bedford.
DR. W. F. HOLMES	Somerville.
DR. H. L. BELDEN	Gloucester.
DR. EVERETT D. HOOPER	Boston.
DR. HIBBERT W. HILL	Boston.

Those in favor of the election of these gentlemen as members of the Association say aye; contrary-minded, no. It is so voted.

We will now listen to the reading of the records of the last meeting by the Secretary.

The records of the last meeting were here read by the Secretary.

THE CHAIRMAN.— Are there any corrections to be made in the records as read? If not, they will stand as the records of the Association.

For want of time, we will omit action on the proposed amendments of the constitution until the next meeting.

Is there any miscellaneous business to be brought before the meeting? If not, we will proceed at once to the paper by Dr. T. B. Shea on "Proper Isolation of Infectious Diseases."

PROPER ISOLATION OF INFECTIOUS DISEASES.

BY THOMAS B. SHEA, M.D.

Proper isolation of infectious diseases is one of great importance to a well-organized health department. For proper isolation it is necessary: first, to have a well-equipped hospital having not only the confidence of the public, but also of the profession at large; second, prompt investigation of cases, when reported, and immediate action. Up to three years ago our department was unable to fulfil these conditions; and, as a result, the proper isolation of infectious diseases was an impossibility.

The conditions then existing and the present ones are, I am happy to state, entirely different.

The hospital in Boston to take care of infectious diseases, especially scarlet fever and diphtheria, is a branch of the Boston City Hospital, known as the South Department, which is entirely distinct and separate from the main hospital, and under the charge of Dr. J. H. McCollom, formerly city physician of Boston. It has a capacity of 224 beds; and since it has been opened, during the past

three years, it has happened occasionally that they have had to refuse cases for the reason that every bed has been occupied. That in itself is, I think, a sufficient recommendation concerning the efficiency and management of the hospital. Therefore, in a hospital such as I have described, it is possible to isolate infectious diseases. What is isolation? I think I cannot better describe its meaning and significance than reading to you a circular published by our Health Department, July 1, 1895: —

CITY OF BOSTON.

HEALTH DEPARTMENT, July 1, 1895.

At a meeting of the Board of Health this day the following regulation was adopted: —

1. Whoever is infected with small-pox, scarlet fever, diphtheria, or membranous croup, shall immediately proceed to some isolated place or room designated by the Board of Health; and no person who has been so affected shall leave such place or room, and no article shall be removed from such place or room, until the Board of Health shall certify in writing that all danger of communicating such disease to others is passed.

2. Every parent or guardian of any child or ward infected with small-pox, scarlet fever, diphtheria, or membranous croup, shall immediately cause such child or ward to be conveyed to some isolated place or room approved by the Board of Health; and no parent or guardian shall permit such child or ward to remove from such place or room until the Board of Health shall find and certify in writing that all danger of communicating such disease to others has passed.

3. No person other than the attending physician, nurse, and agents of the Board of Health, shall enter any apartment or other place set apart for the treatment of small-pox, scarlet fever, diphtheria, or membranous croup until the Board of Health shall certify in writing that such apartment or place has been satisfactorily disinfected.

4. No person having the care of any other person who has been affected with small-pox, scarlet fever, diphtheria, or membranous croup, shall advise or permit such other person to leave any place designated by the Board of Health as a place of isolation of such infected person before said Board of Health shall have certified in writing that such person can leave such designated place without danger to others.

5. No physician who has been in attendance upon any person who has been infected with small-pox, scarlet fever, diphtheria, or membranous croup, shall advise or knowingly permit such person to leave any place designated by the Board of Health as a place of isolation of such infected person before said Board

of Health shall have certified in writing that such infected person can leave such place without danger to others.

By isolation the Board of Health means complete and continued separation of the patient from all other persons, except the attending physician and nurse, from the beginning of the illness until disinfection has been done and the written release from the Board of Health delivered to the patient or those having the patient in charge. In all cases of doubt the patient should be placed in isolation until such time as the attending physician, using all available means, may ascertain the evidence of contagion or infection, and then be immediately reported to the Board of Health. In cases of diphtheria and membranous croup there must be at least two negative cultures reported by the bacteriologist, and in cases of scarlet fever all desquamation from the fever must have ceased, and this fact reported by the district agent, before disinfection will be done or the discharge of the patient be authorized by the Board of Health. The reason and necessity for this will be apparent to all physicians.

At this time was put in operation this method of isolation of cases, especially diphtheria and scarlet fever; and I think sufficient time has elapsed to determine some of the beneficial results that have followed. A few years ago I addressed this Association at Gallop's Island, and at that time outlined the plan of our department for dealing with this question.

For the benefit of the new members and those that were absent at that time, I will briefly describe our methods.

The city is divided into fifty districts. To each is assigned a doctor known as the local medical agent. When a case of diphtheria or scarlet fever is reported, he must visit the case, and report whether or not the case is properly isolated; and this report, I might say, to be of any value, must be made immediately within twenty-four hours. These officers also maintain a medical supervision over the schools, public and private, visiting each and every school at least once a day, and examining, when requested, any children that may be in need of their services. Of course, much reliance must be placed upon this particular corps of officers. I think each and every one of them have the proper ideas what constitutes isolation as interpreted by the department, and their reports confirm it.

To maintain the standard of isolation that I have described means that a great many cases must necessarily be sent to the hospital. It is useless to attempt to isolate many patients in their own homes, for the simple reason that the patient or the family have not the means or facilities to carry out the regulations governing these cases. Cases occurring in hotels, boarding-houses, apartments, and tenement houses, necessarily must be sent to the hospital, as it is impossible to isolate these cases for the reason that persons from infected families necessarily have to use the same halls and elevators in boarding and lodging houses, the same bath-room; and there is an intimate connection with the public dining-room.

Therefore, such cases surrounded with the conditions I have described, you can readily understand why they should be sent to the hospital.

But, you might say, persons and heads of families have an antipathy to sending their children to the hospital. Well, if they cannot appreciate the benefits to be derived, not only to themselves, but also to the rest of the community, the only remedy is to take them; and this we have never hesitated to do in Boston, when the occasion demanded it. In the beginning we had more or less trouble in insisting on this method of isolation. The removals were more in the nature of forcible than voluntary ones. Our officers have been assaulted, and we have had to defend vexatious lawsuits. But all these conditions, I am happy to state, have changed. The people have faith in the hospital and its management; and they recognize the advantages to be derived, not only to themselves, but to their children. The physicians themselves, when called to a case of diphtheria or scarlet fever, knowing as they do the standard of isolation we have set to govern these cases, advise and urge that cases be sent to the hospital.

A prompt removal of the patient, efficient disinfection, a raising of quarantine, the readmission to school,— all these, and many more, are the advantages to be derived. That you might understand of what importance a case of scarlet fever or diphtheria means to children of school age occurring in the same building, I asked our inspectors to furnish me with some data. They report as follows: —

District 1.	One	tenement	house;	8	children	attend	school.
District 4.	"	"	"	22	"	"	"
District 5.	"	"	"	8	"	"	"
District 6.	"	"	"	21	"	"	"
District 8.	Three	tenement	houses;	21	"	"	"
District 9.	Two	"	"	19	"	"	"
District 11.	"	"	"	25	"	"	"
District 12.	One	tenement	house;	7	"	"	"
District 13.	"	"	"	12	"	"	"
District 15.	"	"	"	42	"	"	"
District 16.	"	"	"	12	"	"	"

This shows that a case occurring and not sent to the hospital means the exclusion of children from school for a period of two to three weeks in diphtheria and eight to ten weeks in scarlet fever.

Again, there is a custom prevailing in Boston that is not generally understood by the public at large. In the large stores and those especially that employ a large number of help, exclude from their employ persons coming from infected houses.

Such, gentlemen, is the plan and method of the Health Department of Boston in dealing with this question. That the results have been of great advantage, not only to the department, but also to the public at large, are without question. We have had a diminished mortality from scarlet fever and diphtheria, also a great reduction in the number of reported cases. In diphtheria, anti-toxine has received the credit for this decrease in mortality; but I think isolation of the cases must be considered also. In scarlet fever especially, although the type of the disease for the past few years has been very mild, hospital treatment for these cases are of inestimable value. Again, the medical supervision of schools has been a great factor in our work. Heretofore it was not an uncommon occurrence to be consulted by the members of the School Committee on the advisability of closing certain schools on account of an outbreak of diphtheria or scarlet fever. We always discouraged such procedure and for this reason: the only question to be solved was removing the source of infection, which could be easily accomplished by making a visit to that particular school, sending the children home that were infected, and then efficient disinfection. The last epidemic of this character that was brought to my attention happened about eight

months ago. Immediately after the opening of the schools I found in a particular section of the city an unusual number of cases being reported of scarlet fever. We started an investigation immediately in conjunction with the local medical agent. What was the result? After the examination of the schools in that district we found twenty cases of scarlet fever in different stages. These children were sent home, isolated, the school-houses disinfected, and that was the end of that particular epidemic. You might ask how was it possible under our system of inspection for the children to be in school, and it seems to me a very pertinent question. During the past summer the type of the disease was especially mild. These particular children never had the services of a physician. Consequently, the cases were never reported, and at the opening of the school presented themselves for admission.

Speaking of the medical supervision of schools, I would say it was first adopted three years ago under the auspices of the Boston Board of Health. Since then it has been adopted by many of the towns and cities of this Commonwealth, by many of the large cities of the United States, and, as I have been informed, by some of the cities in the Old World.

Gentlemen of this Association, representing, as you do, the different cities and towns of this Commonwealth, I think there can be no greater work that boards of health can engage in than the suppression of infectious diseases, especially diphtheria and scarlet fever, and no work that will be attended with better results, as it means the saving of many precious lives.

THE CHAIRMAN.— The paper by Dr. Shea is now open for discussion; and I hope we may hear from officers who have come from different cities in the Commonwealth, and that, with very brief remarks, we may learn what is being done in the way of enforcement of isolation. We should be glad to hear from Dr. Chapin, of Providence.

DR. C. V. CHAPIN.— Mr. President, I am sorry to say that we do not do so well in Providence as they do in Boston. The chief difficulty in Providence in isolating cases of contagious diseases is

the opposition of the physicians,— the best physicians as well as the poorest. The Health Department has to keep up a running fight with them all the time. They do not believe in keeping diphtheria and scarlet fever isolated. We cannot keep them isolated as we would like to. We cannot get but one culture in cases of diphtheria, and it is pretty hard to get that.

There is one thing that we do in Providence that Dr. Shea did not speak of, which, I am satisfied; is a very excellent thing, and which we are enabled to do now very generally; and that is, in cases of diphtheria we take cultures from the members of the family when the case is first reported,— all the members of the family who expect to leave the house have to have a culture taken from them. And then, again, at the end of the disease, not only does the patient, but every one else in the family, have to have a culture taken. In that way we find a great many infected persons who are perfectly well; and I am satisfied from my experience that, if they were allowed to go abroad free, they would spread the disease.

The Chairman.— Dr. Chapin is very complimentary to Boston and very modest concerning Providence; but he has already betrayed the fact that Providence is ahead of Boston in the way of taking these cultures. I would like to ask Dr. Chapin what is done with those well members of the family who show the bacilli.

Dr. Chapin.— They are treated just exactly as though they were sick in bed. They are obliged to stay in the house or go to the hospital; that is, if we can make them. The cases we have found are not very numerous. It is very seldom that working people are found with the germ present. It is those who have been brought into intimate contact with the sick one, either little children of the same age or the mother,— occasionally the father or older members of the family, but very rarely.

The Chairman.— It strikes me as an extreme but good method to pursue. I should like to hear from other members of the Association as to how far such a course would be approved. We should like to hear from Dr. Chapin, of Springfield.

Dr. W. H. Chapin.— Springfield is in a transition State just now. We have a bill in the city council, which will probably pass this week, appropriating money for the building of a hospital for con-

tagious diseases, to accommodate twenty patients, perhaps. We have under discussion the inspection of schools, but it does not seem so important in Springfield as it would in Boston on account of the less frequency of contagious diseases and the character of the tenement houses. We have just employed a bacteriologist, and he is taking cultures; and we expect very soon to be as cultured as Boston.

THE CHAIRMAN.— Shall we hear from Brockton, Mr. Carey?

MR. CHARLES H. CAREY.— Mr. President, we have had very few cases of contagious diseases in Brockton for the last six months, I think not more than four or five, and those very light cases. I would say that we isolate them as well as we can. We have no hospital, and we feel in need of that very much. The Board of Health has advocated it, but the city government has not seen fit to give us one as yet. We have been supplied with an apparatus for the use of aldehyde gas, but we have had but a few occasions to use it. We have not been so free from contagious diseases for the past twelve years as we have for the past six months.

THE CHAIRMAN.— Shall we hear from Lowell?

DR. JAMES B. FIELD.— I see you look at me, Mr. Chairman; but I am very glad to say I am not a member of the Board of Health of Lowell just at the present time, for the city council has made a recommendation that a clean sweep shall be made in the *personnel* of the Board of Health. The only person we have there is a bacteriologist, who is here to-day and can speak for himself. In other respects we are far behind Boston; and, if I were on the Board of Health, I should want to hide my head.

THE CHAIRMAN.— Shall we hear from Dr. Gage, of Lowell?

DR. J. ARTHUR GAGE.— I should like to add a word. This is what I find in Lowell. Since getting through with the Board of Health, I have had a case of scarlet fever, and I tried to find out where it came from; but it was reported that there were no cases of scarlet fever, and I found that some of the physicians were reporting the cases as German measles. We haven't any hospital advantages, excepting one hospital, that has a few beds where the city can take a few cases at a rather high rate of board. The city will not build a hospital, and there is no board of health; and the contagious children go to school, and they are not isolated, and the cases are not reported,

and we are in a general state of chaos. I should like to inquire in regard to the expense here. Is it borne by the city generally or is it free?

THE CHAIRMAN.— It is borne first by the city; but, if we find a patient who is able to pay, we collect from him. If such patient is poor and not a resident of Boston, and is a resident of some town in the Commonwealth, then we can collect from such town; but, if he is from without the Commonwealth, then we can collect.

DR. PRESCOTT. — From the State?

THE CHAIRMAN.— Oh, yes, in that case we can collect from the Commonwealth.

DR. PRESCOTT.— It is a very small collection, only three dollars and a half from the Commonwealth, and then only from the time they are entered until they are able to be moved. That is little enough.

THE CHAIRMAN.— There was an old law, not perhaps now in force, which we used to exercise years ago, by which we were authorized to collect from the Commonwealth, and also from any town where the patient had a legal settlement, the reasonable expenses which the Board of Health was put to in the care of such cases. I remember in 1873, in our great epidemic of small-pox, we collected in some cases, I think, as high as $20 to $30 dollars per day; and those very large bills were allowed by the Commonwealth. At that time we collected, as the result of that epidemic, for the city of Boston something over $90,000.

DR. PRESCOTT.— Then at the city hospital there is a man who investigates the settlement of every patient who is admitted; and, if he has a settlement in any city or town in the State, they charge that city or town $1 a day. If he has no settlement, he is charged to the State. They have an agent who goes around; and, when the agent thinks he can be moved to Tewksbury, he is so moved, and the case is stricken off the city's book and the city is not allowed to charge the State except from the time the patient was admitted to the hospital until the city receives notice in regard to his removal. And, when he was at the hospital, the charge was about $3 or $3.25 a week, and the cost was over $10 a week.

THE CHAIRMAN.— Shall we hear from Fall River?

DR. CHARLES A. HICKS.— Mr. President, we have been having

very little contagion in Fall River. We had only 25 cases of diphtheria last year, and there were only 125 cultures taken in all. Our cases of mortality, I think, were very high,— I think something like 30 per cent. I don't fairly understand it. The physicians there are using anti-toxine very generally, but I think the trouble is that we are not using it early enough. In the matter of isolation, it is not so perfect as it is in Boston, inasmuch as we haven't a contagious hospital. The isolation among certain classes is carried out very perfectly. In tenement houses it is not so perfectly carried out, and without a hospital we find it almost impossible to carry out isolation to any great degree. While I think, on the whole, we are doing perhaps as much as any city in the Commonwealth in that direction, there is room for vast improvement. There is one question I should like to ask in regard to the methods in Boston. How long after the removal of a case in tenement houses,— how long afterward are the remaining children allowed to attend school?

THE CHAIRMAN.— The law fixes that at two weeks after the death, removal, or recovery of the last case.

DR. HICKS.— That is the method we follow there.

THE CHAIRMAN.— We should be glad to know what is done in the city of Newton in regard to isolation and any difficulties arising in its enforcement. Shall we hear from Dr. Curtis?

DR. FRANCIS G. CURTIS.— Mr. Chairman, we have here in Newton a small hospital for contagious diseases, both diphtheria and scarlet fever; and I think that the greater number, or perhaps between 30 and 40 per cent. of our cases of contagious diseases, are sent to the hospital, so we have very little difficulty in isolation. The city appropriates a certain amount of money every year to pay the expenses of the care of these cases at the hospital. So we are able to state to the parents of the children that we can take them up there, and take care of them with very little expense to them. Of course, if they are able to pay, the hospital collects. Otherwise the city has borne the expense.

THE CHAIRMAN.— We have with us this afternoon one new member who has observed the workings of the health departments of several of our cities in this country, and we shall be glad to hear from him in this line,—Dr. Hill of Boston, Director of the Laboratory of the Board of Health.

Dr. Hibbert Hill.— Mr. President, the point that strikes me particularly here is with regard to the infection of healthy persons who come in contact with a person unavoidably during the progress of a case of diphtheria. That was brought up by the first gentleman who spoke, and it seems to me a matter of considerable importance. Although I don't remember any work done on that special point in Brooklyn, I know of a great deal of work that was done in Philadelphia; and I had proof of those persons who came in contact with persons that they were found to have diphtheritic germs in the throat. That leads me to think that either the persons so infected may themselves develop the trouble or they may infect others with whom they come in contact afterward without actually developing a case themselves. It is a great problem to know what to do with these people, because there are a large number — I have forgotten the exact percentage — of persons who come in contact with such persons who receive the bacteria. It is rather a problem for the laboratory side, and it gives me great pleasure to leave it with the present Association to settle.

The Chairman.— Not being able to recognize every one who is filled with a desire to speak on this subject, I will call for any one who would like to discuss the paper which has been read. Dr. Abbott.

Dr. S. W. Abbott.— Mr. Chairman, Dr. Shea's paper is one of unusual importance and value to this Association, because it treats of the topic which, to my mind, is the most important of all to local boards of health. The management and control of infectious diseases constitute unquestionably the highest and most important duty of such boards; and, among the many different measures employed for the prevention of disease, isolation stands first of all. The prevention of infectious disease is, in fact, a warfare,— not merely a warfare of to-day or to-morrow, but one which is always going on. The Germans use a very expressive term for this purpose; that is to say, the *campaign* against infection.

The isolation hospital is one of the more recent methods employed in this country, and a very effective one for carrying out this purpose. It has reached its highest perfection in Great Britain, where there are now at least four or five hundred such establishments; and

almost every city and town of seven or eight thousand inhabitants has such an institution.

In Massachusetts, so far as I can learn, there are now existing or under way such hospitals in the following cities: Boston, Lynn, Worcester, Newton, Brookline, Waltham, and Springfield.

It may be proper here for me to allude to the marked differences which are peculiar to the different infectious diseases with reference to the necessity of isolation.

That the spread of such diseases is due to the close contact of people is shown by the following figures. If we divide the State into two classes or districts,— the densely and the sparsely settled districts,— we shall find the following facts to be true: that for every 1,000 deaths from consumption in the dense districts there were 727 in the sparse districts; for every 1,000 cases of diphtheria in the dense there were 634 in the sparse districts; of scarlet fever, 1,000 in the dense to 587 in the sparse districts; of measles, 1,000 in the dense to 445 in the sparse districts; of small-pox, 1,000 in the dense and only 149 in the sparse district, small-pox being, in fact, the most contagious of all known diseases.

This goes to show that in the sparse district people are already isolated in a considerable degree by the very fact of their distance from each other.

These figures are the result of observation upon about 200,000 deaths from the diseases to which I have referred.

Typhoid fever, on the other hand, does not appear to be subject to the same laws, since the method of its spread is entirely different from that of the other diseases; and in this case we have 1,000 deaths in the dense district to 1,175 in the sparse.

A very good reason for the employment of infectious disease hospitals consists in the inability of the working class to furnish accommodation for the isolation of the members of their families who may become ill with infectious disease. Such families usually live in tenements having from one to four rooms, none of which can safely be devoted to the treatment and isolation of infectious diseases of a dangerous character. The serious overcrowding which prevails in some of the large cities of Great Britain has not yet been reached in any of our large cities, but the tendency is in that direction. (Glasgow has a population of more than 100,000 living in one-room tenements.) The very great increase of the population of this class by immigration has been the chief factor in causing overcrowding in our cities during the past decade.

Another important advantage secured by the isolating hospital is found in the fact that the ordinary duties of the household, the attendance at school, and especially the support of the family by its wage-earners, can be carried on without disturbance, the danger of infection having been removed by the transfer of the sick member of the family to the hospital. It has not unfrequently happened that the local sanitary authorities in some of our cities and towns have not only rigorously enforced the law relating to non-attendance at school, but have also quarantined the whole family, old and young, so that by this means the scholar is deprived of from two to ten weeks, or even more, of his educational privileges at the most important or most receptive period of his life, the length of time depending upon the duration of illness in the infected household. And, more than this, the father and other wage-earners have been kept from work in the mill, the factory, or the workshop. Even if he is allowed to work, his fellow-workmen are wont to regard him with suspicion so long as a case of any one of the infectious fevers exists in his household. Now the prompt removal of such cases permits the school attendance and the employment of other members of the family to go on undisturbed.

In all my experience with local boards of health during the past few years I know of no circumstance or condition which has given more serious trouble and perplexity than this; nor do I know of any which is likely to be relieved to so great an extent as is this condition by the introduction of the isolating hospital.— *Twenty-fifth Annual Report of State Board of Health of Massachusetts, p. 692.*

Allow me to quote still further from the same volume, page 704: —

Let us for a moment consider a practical illustration of such a system as I have outlined: A father, mother, and four small children, the latter aged two, four, six, and nine years, occupy a tenement of two rooms, including a kitchen and sleeping-room, each about twelve feet square and seven and a half or eight feet high. The kitchen is the cooking and living room of the family, and both are heated by the kitchen stove. The sleeping-room is occupied at night by the whole family; and, after allowing for the space taken by the furniture, there are in this room about 175 cubic feet of air-space only to each person, which is doubled by the open door into the kitchen. The sleeping-room has but one window, which in winter is kept constantly closed; and there are no special means for ventilation. I am not here describing an unusual case, but, on the contrary, one which is of very common occurrence in any one of our large manufacturing cities.

One of these little children is taken ill with diphtheria in its severest form. There is no provision in the city for such cases, and the mother gives the child the best care which she can afford under the circumstances. The neighbors are afraid to take the other children to their homes. The next child is too young to attend school; and the law excludes the older children from school during the prevalence of illness in the family, thus making their exposure to infection more certain. After days of weary watching another child falls ill; and then perhaps

the mother herself, worn with care and solicitude for her little ones, becomes a victim to the disease. Meanwhile the youngest has died, and is laid out for burial in a corner of the kitchen, the living-room of the family.

Dr. Russell, the health officer of Glasgow, in commenting upon such cases, which, in a crowded city like Glasgow, were once of very frequent occurrence, says, when contrasting the condition of the rich and of the poor: —

"Last of all, when *you* die, *you* still have one room to yourself, where in decency you may be washed and dressed and laid out for burial. If that one room were your house, what a ghastly intrusion you would be! The bed on which you lie is wanted for the accommodation of the living. The table at which your children ought to sit must bear your coffin, and they must keep your unwelcome company. Day and night you lie there until with difficulty those who carry you out thread their tortuous way along the dark lobby and down the narrow stair through a crowd of women and children. You are driven along the busy and unsympathetic streets, lumbering beneath the vehicle which conveys your scanty company to the distant and cheerless cemetery, where the acrid and deadly air of the city in which you lived will still blow over you, and prevent even a blade of grass from growing over your grave."

Dr. Russell has here graphically described a death among the abodes of the poor; but, when the death is from infectious disease, the conditions are still worse, since the added danger of infection to the remaining members of the family only doubles the distress of the household. Now for such conditions as I have described the infectious disease hospital provides a most excellent remedy; and, while it may not prevent the occurrence of the first case in the family, it does provide for the taking of the infected person to a suitable place, where he will not only receive far better care himself, but will not transmit the infection to his brothers, his sisters, or to any other person.

In the hospital, too, in place of overcrowded and ill-ventilated bed-chambers, there are large and well-ventilated wards; in place of foul air and darkness, there is fresh air and sunlight; in place of scanty food, and food that is ill adapted to the wants of the sick, there is food selected especially for the case in hand; and, more than all this, there is good nursing and the best of care; and, when the patient has recovered, he is returned to his family, no longer a source of danger and of infection.

In summing up this question, the Local Government Board of England, in a memorandum published in 1890, presents the following advantages to be secured by the establishment of isolation hospitals for infectious diseases: —

1. They allow the complete isolation of the sick in cases where the sick cannot be effectively separated at their homes.

2. The work of the wage-earner, the ordinary duties of the household, and the school attendance of children can go on as usual without interruption.

3. Infection is thus kept by itself in a place where it can be intelligently treated and destroyed. Otherwise, in tenement houses and crowded dwellings, and among those who are ignorant of its nature and its proper management and control, it may spread and cause infinite harm.

4. Cities requiring such hospitals should not wait for the hurried impetus derived from panic, but should construct carefully and thoroughly, and with due regard to their own special needs. Such hospitals, like fire departments, when completed, should be always ready for immediate use. They should be accessible and under wise and intelligent management.

THE CHAIRMAN.— Is there any other gentleman who wants to make any remarks on Dr. Shea's paper? There has been and still is much hesitancy on the part of many boards of health of this Commonwealth in the removal of cases of contagious diseases to the hospital. The more united this Association is upon this subject, the easier it will be for each individual board of health to act; and this is the time when opinions should be expressed, and, if possible, a united feeling upon this question be obtained. It is one of the objects of this Association. I hope every one will express his fullest views as to the approval or disapproval of this method of caring for contagious diseases. There are still a few minutes more. We want to adjourn at four o'clock.

DR. WILLIAM H. PRESCOTT.— Perhaps members of the Association would be glad to hear of the experience which I had as physician to the Home for Little Wanderers in Boston, situated on West Newton Street. It has about one hundred children, as a rule; and last spring we started in with diphtheria. We usually have it about once a year; and last year it came early, and stayed late. We had at least forty cases among the one hundred children. Finally, we made up our minds that the only way to do was to go through all the children and all the people who had anything to do with the children, and take a culture from every throat, and every nose where there was any discharge from the nose. We did that the first time; and we got eight children who had no symptoms whatever of the disease, but had the bacilli of diphtheria in one or the other of the places. Each child, as it was discovered, was sent to the hospital, Dr. McCullum very kindly taking care of the children until they were over the bacilli of diphtheria. We had another case start up; and we went over them again, and got six. In this way we went

through them four times, until finally we reached the point where there were no other cases of diphtheria. There were no cases, so far as I know, among the adults; but they were all among the children. One of them was the little boy who attended the door. He had bacilli in his throat; and the bacilli were found to be virulent, although, so far as you could see, the boy was healthy. It seems to me we cannot be too strict about that.

With reference to taking cultures from other members of the family, Dr. F. H. Williams, of Boston, has done that for several years. I forget just when he started in, but in a number of cases he has found the bacilli in the throats of people who were perfectly well; but they have been isolated and cared for just as if they had been real cases of diphtheria, because, in a way, they are more dangerous to public health than those people who have the disease and are sick. The latter are in bed, and are kept away from others. Diphtheria is not a disease where the germ is in the air, as it is likely to be with measles and scarlet fever; but you have to come in contact with something that has been handled or spat upon by the patient who has had the germs. That has been shown, I think, pretty conclusively by the results in the State hospital, where they have never been able to develop diphtheria on the cultures from bacilli taken in the air; but they have got to find them on the floor, from the shoes of the nurse, the hair of the nurse, and any place that is touched, any part of the furniture, or the handle of the door. So that you could walk through a room where a diphtheria patient was as safely as if you were in the other room, so long as you touched nothing.

THE CHAIRMAN.— Dr. Shea, will you close the discussion with a few words?

DR. SHEA.— I think I covered the subject as well as I could in my paper. There is one thing that Dr. Abbott spoke about that I think is a great factor in this question, especially the virulence of diphtheria. It has been my experience, and especially before we obtained the hospital to deal with this disease, that in a tenement house where we had a large family, probably eight or ten people occupying two or three rooms, that the first case that came down with diphtheria was not very sick. The second case was always a

little more virulent; and there seemed to be a ratio there, the more of the children that were sick, the more virulent the disease became. And I think, as Dr. Abbott has said and read in that book to us, that, if you can take the patient to the hospital, the type of the disease is going to be less virulent. That is the point I tried to bring out. As regards the anti-toxine, anti-toxine has received all the credit for the decrease of diphtheria; but I think the isolation of cases has been a great factor.

THE CHAIRMAN.— If the Association will pardon me, I should like to suggest that there is one thing connected with this question of isolation of contagious diseases, particularly with diphtheria, which has given us in Boston, as I fancy it has you, gentlemen, in other cities, a great deal of trouble; and that is the official care of persons who are carrying diphtheria bacilli in their throats without being ill. It is a very serious question with the boards of health as to what shall be insisted upon; and I have thought that it would be worth while for this Association to give a prize — and we can well afford it — for the best essay obtainable on this subject. I do not know if the Association is ready for this question, but I would like to see if the Association will have a committee appointed who shall be authorized to award a prize of fifty dollars for the best paper on this subject. Personally, I can see no better way of calling out the best thought on this subject than in such a course as this. Our funds are ample, and I do not know of any better way of using a moderate amount of money than this. Is there any one who would like to say anything upon this question?

DR. A. E. MILLER.— Mr. President, it seems to me that it would be a very fine idea to carry your suggestion into effect; and I would move that a committee of three be appointed to take this matter into consideration, appointed by the chair,— a committee of three.

DR. PRESCOTT.— I second the motion.

THE CHAIRMAN.— Do you mean a consideration as to whether or not we should adopt this course?

DR. MILLER.— No, sir, I would amend my motion. I would move that we adopt this course, and that a committee of three be appointed to receive the essays and make the different regulations found to be necessary. In the first place, that we adopt this plan, and then that a committee of three be appointed to carry it into effect.

THE CHAIRMAN.— Would you divide your motion into two parts?

MR. MILLER.— Certainly. I would move that the suggestion of the President be adopted.

DR. PRESCOTT.— I second the motion.

THE CHAIRMAN.— It is moved and seconded that a prize of fifty dollars be offered for the best paper upon the subject of what we shall do with persons in whom we find diphtheria bacilli without illness, either during convalescence from diphtheria or otherwise.

A MEMBER.— I should like to ask if that is limited to the members of this Association.

THE CHAIRMAN.— No, sir, it is not so intended.

Motion duly carried.

THE CHAIRMAN.— I should like to suggest a committee of five instead of three. Do you agree to that, Dr. Miller?

DR. MILLER.— All right.

THE CHAIRMAN.— How shall this committee be appointed?

DR. MILLER.— Appointed by the chair or presiding officer.

THE CHAIRMAN.— It is moved and seconded that a committee of five be appointed by the chair to receive the essays and select the best one upon this subject. Anything to be said?

A MEMBER.— I would move that the Chairman be a member of that committee *ex officio*.

DR. ABBOTT.— I should like to suggest one or two things in addition to that; that is, that the committee be authorized to limit the length of the paper, and that they be authorized to divide the prize in such a way that it would be expended in three parts,— one of twenty-five dollars, one of fifteen dollars, and one of ten dollars. It seems to me that it would give a wider and more encouraging feature to those who compete for it.

DR. CHAPIN.— Mr. President, I should like it very much if the scope of that subject could be made a little broader. I have looked at it a great deal; and I have not been able to find very much evidence as to the prevalence of the diphtheria bacilli in throats of well persons, and still less as to its danger. Now it is very important, in giving our sanction to any line of treatment of such a case, to have

sufficient data upon which that treatment should be based. I should be glad if the scope of the subject could be broad enough to embrace that, its danger as well as the treatment of the person.

THE CHAIRMAN.— I think it would be necessary to rescind this other vote, Dr. Chapin, before we could amend it, now that it has passed.

MR. ELLIS.— Mr. President, couldn't that all be left to the committee to arrange details?

MR. CHAPIN.— With full power.

THE CHAIRMAN.— I think that may be arranged, doctor, without a vote. It has been moved and seconded that a committee of five be appointed by the chair to receive the essays and select the best one. Those in favor will say aye.

Carried.

DR. PRESCOTT.— I will second the motion to add the Chairman.

DR. ABBOTT.— I will put that motion, if you are too modest in the matter. Those in favor of having the Chairman added to this committee say aye.

Carried.

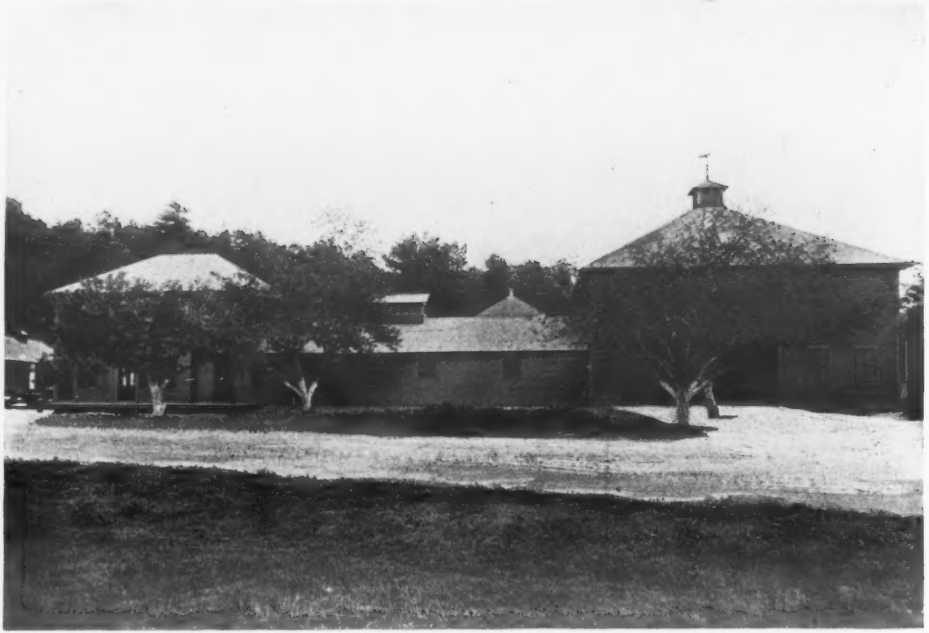
The committee consists of Dr. S. H. Durgin, *ex officio*, Dr. William H. Prescott, Dr. Hibbert W. Hill, Dr. C. V. Chapin, and Dr. J. Arthur Gage.

Before adjournment a unanimous vote of thanks was tendered to Mr. Ellis for his entertainment, after which all present were carried by special cars to Wauwinet Farm, West Newton, Mr. Ellis's dairy farm, which has been referred to in previous numbers of this *Journal*, and a detailed description of which follows.

A MODEL DAIRY FARM.

Wauwinet Farm, situated on Commonwealth Avenue, almost in the geographical centre of the city of Newton, is the result of a systematic attempt to furnish, direct to consumers, absolutely pure milk of the highest quality, produced, bottled, and delivered under the most favorable conditions. From an exceedingly small beginning, with a herd of four cows, furnishing in 1891 milk for the proprietor's family and allowing of the sale of about sixteen quarts per day to neighboring customers, it has grown to a total daily output, in 1898, of about sixteen hundred quarts of milk, all sold and delivered within a radius of about three miles from the main farm. Where in 1891 the stock was all kept in a small shed, to-day three farms, with extensive barns, are required for the accommodation of the herd of cattle; and new buildings, equipped with the most modern devices and machinery, are used in the conduct of the business.

At the home farm one hundred and forty-three of the best milking cows are constantly kept, while at Wauwinet Farm No. 2, situated at Kendal Green, Weston, five miles away on the road to Concord, Mass., are kept the cows giving the least milk. Wauwinet Farm No. 3 is situated in Concord, and here are kept the dry stock and young stock. Wauwinet No. 2 has a capacity of seventy cows, while at Wauwinet No. 3 one hundred head can be accommodated. Between these three places are now kept about two hundred and fifty cows, all Jersey, or Jersey grade, producing milk which averages by chemical analysis nearly fifteen per cent. total solids and five per cent. of butter fats. A few cows giving less rich milk are kept for the special purpose of furnishing infants' food. The stock is transferred from one farm to another in specially built wagons, carrying six cows at a time. A load is made up at the home farm of the cows giving the least milk, and these are taken to Kendal Green, where they are exchanged for the same number of nearly dry cows, which are transferred to Concord. Here a load of fresh cows is taken on and returned to Wauwinet Farm No. 1, the entire trip consuming a day.



PARTIAL FRONT VIEW OF BARNS.

REAR VIEW OF BARNS AND SILO.

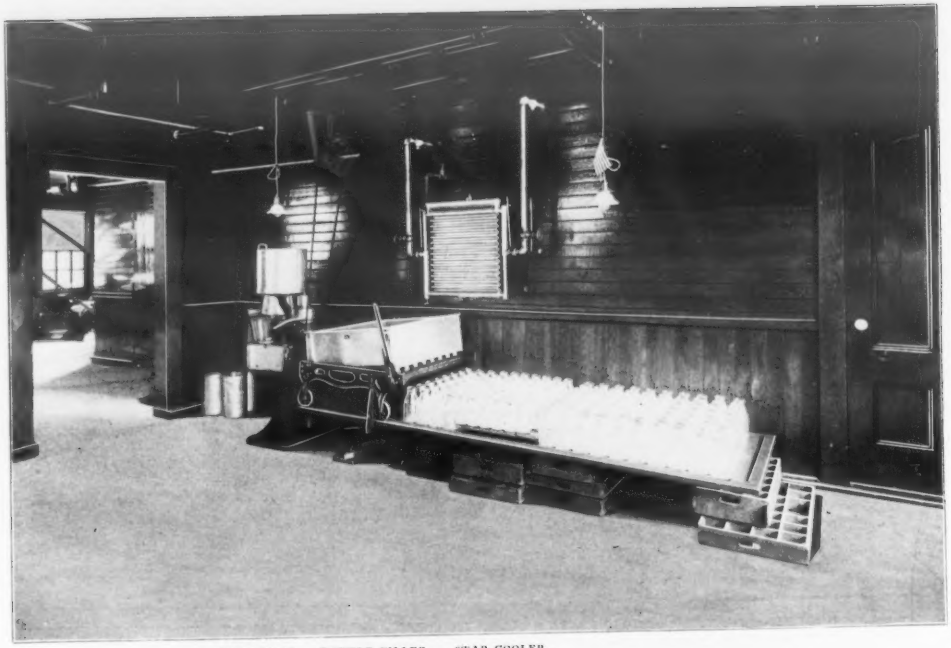
The main farm, where most of the milk is produced, and which is headquarters for its distribution, consists of twenty-five acres, and contains three adjoining barns, the largest of which, one story with monitor roof, built in 1896, is one hundred and twenty-seven feet long by eighty-five feet wide, and contains ninety-two pens, each seven feet by nine feet, similar to box-stalls, in which the cows are never tied. Each pen is supplied with a hinged feeding-manger, which, when not in use, is shut down, thus excluding all dirt, and with a drinking-trough with a galvanized iron cover, easily raised by the cow's nose, furnishing a constant water supply.

There are no floors to these pens, but over the surface of the ground — which is part loam and part gravel — are spread about four inches of sand; and over this is a good layer of planing-mill shavings. In cleaning the barns, the droppings and dirt are gathered in a cart specially built for the purpose, which is driven through the alleys every day; and fresh shavings are supplied, while as often as need be (usually once in from four to six weeks) a more thorough cleaning is undertaken, and fresh sand supplied. In the older barns the cattle are confined by the Prescott stanchion; and here the cows stand upon eight inches of sand, laid upon a concrete floor, with a gutter behind the stalls which is thoroughly cleaned every day. The barn cleanings are dumped from the cart into a large wagon, and are immediately carried to some of the outlying land.

The employees are all dressed in white duck suits at milking time, and are required to keep themselves and their cattle scrupulously clean, the cows being thoroughly groomed every day. Each man milks fifteen cows, milking commencing at four o'clock A.M. and three o'clock P.M., and occupying nearly two hours at each time.

Adjoining the barns is a two-story house, about twenty-five feet by fifty feet, containing a bottling-room, engine-room, and cold-storage room on the ground floor, and chambers for the help on the upper story. Behind the barn is a silo, twenty-four feet in diameter and forty feet deep, capable of holding about five hundred tons of ensilage; and there are several outbuildings for calves, bulls, etc. Sixteen horses are quartered in the large barn, and five bulls — all registered Jerseys — are kept for the service of the herd. Beyond the bottling-room is a good-sized boarding-house for the help, and in

INTERIOR OF NEW BARN.



SEPARATOR. BOTTLE FILLER. STAR COOLER.

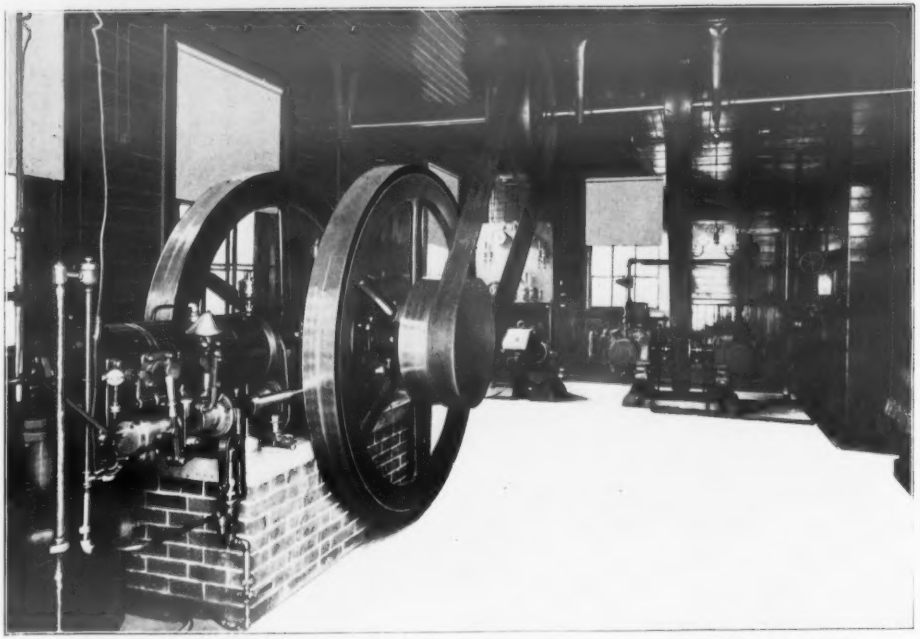
BOTTLING-ROOM.

this building the farm office is located. On the three farms from twenty-eight to thirty-five men are regularly employed, according to the season; and extra help is employed during ensilage cutting. Most of these men are permanently quartered on the home farm.

During milking, each pailful of milk is emptied into a tank at the end of the barn, next to the bottling-room. On entering and leaving this tank, the milk is strained through cheese-cloth, and is carried through the partition into the bottling-room to the distributing trough of a Star milk aërator and cooler. This apparatus, which aërates the milk and gradually but quickly reduces its temperature, consists of a double corrugated surface of sheet copper, heavily tinned, through the inside of which is forced a continuous stream of cold water or brine while the milk passes from the distributing trough in such a way as to flow over the entire surface in a thin film, leaving the cooler at a temperature suitable for immediate delivery. By the construction of the Star cooler the water or brine is forced upward through the inside of the cooler while the milk is flowing downward over the outside, thus insuring the most gradual and continuous reduction of temperature. The extent of surface is sufficient to insure the milk leaving the cooler at a temperature only a few degrees higher than the temperature of the water or brine within.

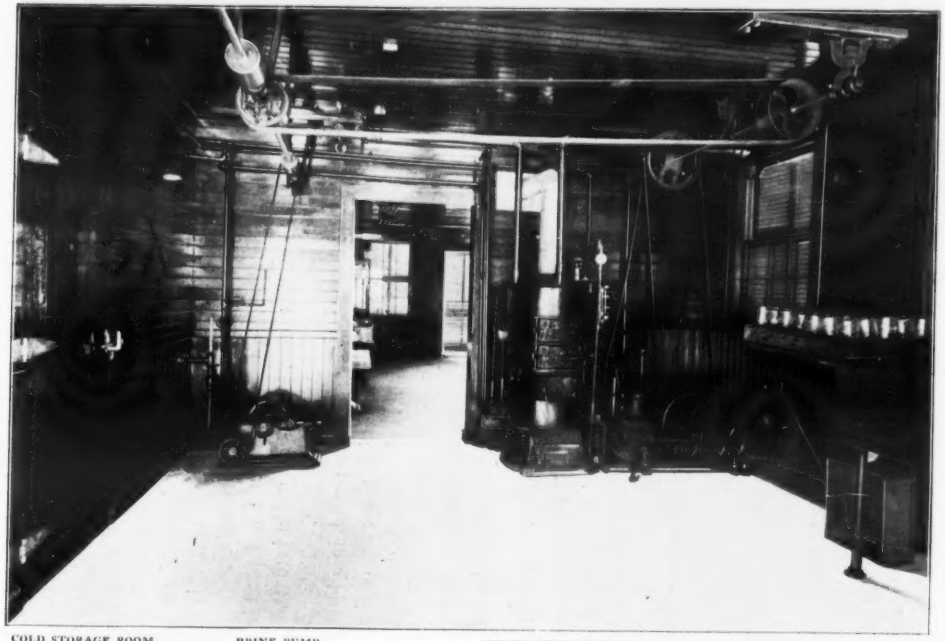
This apparatus at Wauwinet Farm is cooled by brine from a refrigerating plant manufactured by Westinghouse, Church, Kerr & Co., of a capacity equalling the melting of two tons of ice each twenty-four hours, which effects a reduction in the temperature of the milk from about 95 degrees to about 36 degrees during the few seconds required for its passage over the surface of the cooler. This is, of course, a much lower temperature than could be reached by the use of water in the cooler; and it is, in fact, possible to flood the cooler with brine cold enough to freeze the milk in its passage.

This refrigerating apparatus, the use of which for this particular purpose is quite novel in dairy farms, consists of an ammonia compressor, a condenser, expansion valve, expansion coil, brine tank, and brine pump, and operates as follows: A flask of liquid anhydrous ammonia under pressure, being supplied from the condenser, passes through the expansion valve, a small needle-like opening



OTTO GASOLINE ENGINE. EDDY MOTOR. REFRIGERATING CONDENSER.

ENGINE AND REFRIGERATING ROOM.



COLD STORAGE ROOM. BRINE PUMP. WINCHESTER HEATER.

ENGINE-ROOM, LOOKING TOWARD BOTTLING-ROOM.

which admits the ammonia slowly into the expansion coils of pipe within the large brine tank. The sudden expansion (evaporation) of the liquid ammonia into ammonia gas rapidly reduces the temperature of the brine in the tank, after which the gas is drawn back into the compressor, from which it passes through the condenser, a series of pipes cooled by a continuous film of water flowing over their surface, in which the ammonia gas is condensed into liquid ammonia, to be forced again through the expansion coil, this operation being repeated almost indefinitely without recharging.

Meanwhile the brine, cooled to a low temperature, is forced by the brine pump through the milk cooler, and back again into the tank for recooling, another practically indefinite operation. This process is similar to that by which artificial ice is made; and, in addition to the use made of the brine in connection with the milk cooler, the compartment which contains the brine tank, being kept at a temperature of about 40 degrees, forms a perfect refrigerator, used for the storage of milk. The expense of such a process is almost entirely in the first cost of the plant, as it does not require recharging with ammonia or a resupply of brine oftener than once a year.

The refrigerating plant is operated by an Otto gasoline engine (size 5 B), of 13½ actual horse power, which also furnishes all the motive power required at the farm. In addition to running the refrigerating compressor and brine pump, it operates the dynamo, separator and two water pumps. The great value of such an engine is found in its compactness, occupying but a small space; its simplicity, requiring no engineer, and easily run by any intelligent operative; and its extreme economy. All the barns and buildings at the home farm, including the proprietor's house, are lighted by electricity, which is furnished by a ten horse power Eddy dynamo run by the gasoline engine. In addition to running the electric lighting plant, the dynamo also furnishes power through a seven and a half horse power Eddy motor, which is mounted on a portable car, and operates the machinery used in cutting corn for feed and for the silo. This motor has replaced a horse treadmill formerly used in cutting the fodder and an engine formerly required for cutting ensilage. The dynamo has proven satisfactory and economical in the highest degree, being entirely automatic, and requiring no skilled

WAUWINET No. 2, KENDAL GREEN, MASS.

WAUWINET No. 3, CONCORD, MASS.

labor for its operation. The gasoline engine at Wauwinet Farm has been in operation for about a year, during which time it has cost almost nothing for repairs, and has easily furnished all the power required for the electric lighting, refrigerating, and other machinery of the farm at an average cost of about sixty cents per day.

The heating of the bottling-room, engine-room, seven chambers for help, and a smoking-room for the men, as well as the supplying of hot water for the washing of bottles and all other purposes required, is effected by a Winchester heater which has proven durable, easily operated, and economical in its service.

Returning to the bottling-room, the milk, on leaving the cooler, is bottled quickly and automatically by means of a Child's patent milk-bottle filler. The milk flows from the cooler into a large tinned copper tank, in entering which the milk is again strained through cheese-cloth. This tank runs on wheels on a track over a slab on which the milk-bottles are placed in rows of eight. In the bottom and at one end of the tank is a row of valves fitted with rubber caps, which, by means of a lever, are pressed down tightly over the mouth of each bottle in the row, while by the same movement of the lever the valves are opened, allowing the milk to flow into the bottles. Since the automatic valve seals each bottle tightly while in position, as soon as one bottle is filled, it does not overflow; and, when all the bottles in a row are filled, the milk will cease to flow. The lever is then raised, closing the valves and raising the tank, which is wheeled into position over the next row of bottles, and the process repeated. An air-vent destroys all foam, allowing the bottles to fill, leaving just room enough for the paper cap — used to close the bottles — to go on without spurting. The Common Sense milk-bottles are used, having no cover, easily and quickly cleaned, and sealed with a heavy wood-fibre paper cap, prepared to resist moisture from within and without, and which, when pressed into the neck of the jar with the thumb, is held in position by a shoulder blown in the bottle. This forms an air-tight cover, which will not leak, no matter in what position the bottle is placed. The caps can be instantly lifted out by a pen-knife or any sharp instrument, and are so inexpensive that they can be discarded after once being used.

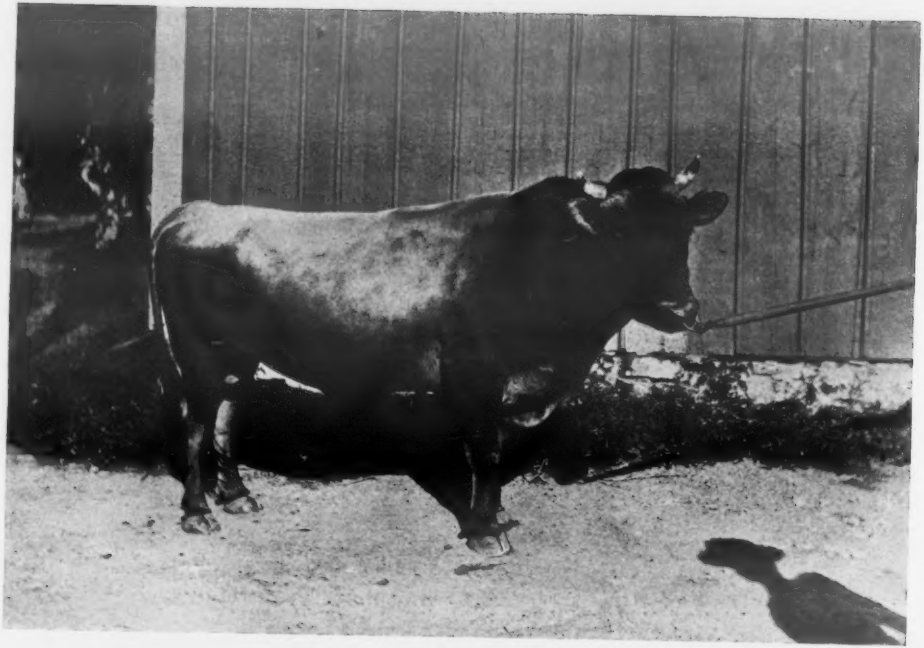
The delivery of milk is made night and morning, four low-down

wagons being used, each starting out as soon as it can be loaded, so that much of the milk reaches the customer within an hour from the time it leaves the cow.

Situated as the farm is, in the midst of high-priced land, the feed problem is a serious one. At the home farm the cows are fed in the barns all the time, although they are turned out in a five-acre lot for exercise every week-day in pleasant weather. In winter the daily feed is from thirty to thirty-five pounds of good ensilage, eight to ten pounds of mixed grain, and all the good hay, principally clover, that the cows will eat. As soon as good soiling crops can be had in the spring, they are largely substituted for the ensilage, although, preferably, a small amount of the latter would be fed every day. The soiling crops are first winter rye, then winter wheat, followed by clover, and peas and oats, which are sown at various times (beginning as soon as the frost leaves the ground), until good, fairly matured sweet corn can be obtained. This is then the main reliance until frost comes, when ensilage is resumed. The total acreage owned and leased is about eight hundred acres.

In view of the feeling sometimes expressed, that the conducting of dairy farms upon such lines as these must be the result of a hobby and cannot be profitable as a mere business venture, it is only fair to say that, while Wauwinet Farm has undoubtedly been developed by the deep personal interest of its proprietor in the problems of a perfect dairy system, its results are such as to amply justify the prosecution of an experiment so congenial to its owner's taste. The enormous increase in the business has come about without the aid of advertising or special effort to secure trade. The milk is sold at eight cents per quart, from one to two cents higher than the price obtained by other producers in the same field; and the demand for the milk is in excess of the present capacity for production.

YOUNG STOCK AT PASTURE.



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